

Position Statement for NSF-CDI Project 2015 Workshop in San Diego on Human Dynamics Across Social Media and Social Networks

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Understanding the Dynamics of Mood as Reflected in Social Media: Evidence and Implications of Chaos

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Around 60 years ago, the explosion of technological advances in conventional radars permitted knowledge discovery in inferring dynamics of physical motion. The recent explosion of social media offers a promising opportunity for knowledge discovery in cyberspace and big data. One natural focus is the dynamics of mood as reflected in Twitter data.

Exploration of the extent to which human mood has chaotic and non-linear dynamics has profound implications. Examination and analysis of over 20000 data points reflecting hourly summary statistics of hundreds of thousands of Twitter messages reveal chaotic dynamics. In particular, the greatest positive Lyapunov exponent approach and a binary 0-1 test method were applied to conclude that the examined Twitter data exhibits deterministic chaos properties.

This preliminary evidence suggests that nonlinear dynamics and complex systems theory may be useful to overcome current limitations in understanding social behavior and information associated with massive social datasets. In particular, this finding suggests that linear models for social data analysis might not be sufficient to fully understand and forecast critical transitions trends over time and beyond limited periods. Instead nonlinear dynamic methods would be required.

*This work is joint work with Waldemar Karwowski (University of Central Florida), Nabin Sapkota (University of Central Florida), Tareq Ahram (University of Central Florida) and Dylan Schmorrow (Soar Technologies).

